



# Cambright Solved Paper

Tags	2023 CIE IGCSE Computer Science May/June P1 V1
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Status	Done

1 Binary is a number system used by computers.

(a) Tick (✓) **one** box to show which statement about the binary number system is correct.

- A It is a base 1 system ☐
- B It is a base 2 system ☒
- C It is a base 10 system ☐
- D It is a base 16 system ☐

[1]

(b) Denary numbers are converted to binary numbers to be processed by a computer.

Convert these **three** denary numbers to 8-bit binary numbers.

50 .....00110010.....

102 .....01100110.....

221 .....11011101.....

[3]

$$50 = 32 + 16 + 2$$

$$102 = 64 + 32 + 4 + 2$$

$$221 = 128 + 64 + 16 + 8 + 4 + 1$$

(c) Binary numbers are stored in registers.

Negative denary numbers can be represented as binary using two's complement.

Complete the binary register for the denary number  $-78$

You must show all your working.

$$78 = 64 + 8 + 4 + 2$$

$$78 = 0100\ 1110$$

Flipping this to get a negative:  $1011\ 0001$

Adding 1 to this:  $1011\ 0001 + 1 = 1011\ 0010$

Register:

1	0	1	1	0	0	1	0
---	---	---	---	---	---	---	---

[2]

(d) Two 8-bit binary numbers are given.

Add the **two** 8-bit binary numbers using binary addition.

Give your answer in binary. Show all your working.

$$\begin{array}{r} \phantom{00}11\phantom{00}\phantom{00}11\phantom{00} \\ 00110011 \\ + 01100001 \\ \hline 10010100 \end{array}$$

[3]

(e) Two binary numbers are added by a computer and an overflow error occurs.

Explain why the overflow error occurred.

The result of the value is greater than 255, so it requires more than 8 bits to store and represent.

- 2 A student has a sound file that is too large to be stored on their external secondary storage device. The student compresses the sound file to make the file size smaller.

The compression method used reduces the sample rate and the sample resolution of the sound file.

(a) State what is meant by the sample rate and sample resolution.

Sample rate - The sample rate is the number of samples taken per second.

Sample resolution - The sample resolution is the number of bits per sample.

(b) Identify which type of compression has been used to compress the sound file.

Lossy compression

(c) The student sends the sound file to a friend. The file is transmitted across a network that uses packet switching.

(i) Identify **two** pieces of data that would be included in the header of each packet.

- The IP address of the sender
- The IP address of the destination/receiver
- Packet number

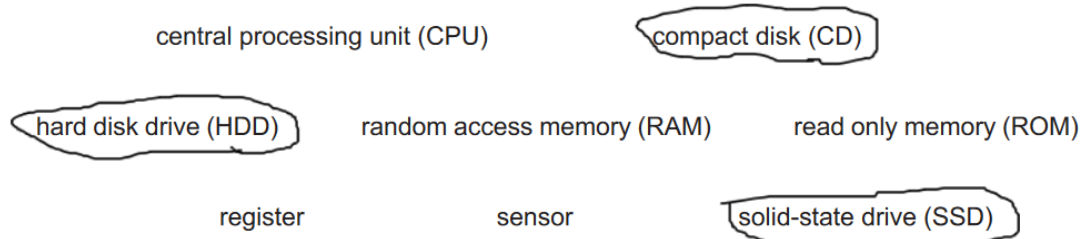
(ii) Explain how the file is transmitted using packet switching.

Any 5 from

- Data is broken/split into many different packets
- Each packet could take a different route
- A router controls the route a packet takes
- ... selecting the fastest possible route
- Packets may arrive out of order
- Once the last packet has arrived, the packets are reordered
- If a packet is missing or corrupted, it is requested again

3 Secondary storage devices are used to store data in a computer.

(a) Circle **three** components that are secondary storage devices.



[3]

(b) Tick (✓) **one** box to show which statement about secondary storage is correct.

- |   |                                     |
|---|-------------------------------------|
| <b>A</b> It is directly accessed by the CPU.                      | <input type="checkbox"/>            |
| <b>B</b> It is magnetic storage only.                             | <input type="checkbox"/>            |
| <b>C</b> It is used to permanently store software and data files. | <input checked="" type="checkbox"/> |
| <b>D</b> It is volatile.  | <input type="checkbox"/>            |

[1]

4 Complete the statements about different types of software.

Use the terms from the list.

Some of the terms in the list will **not** be used. You should only use a term once.

application      assembly language      bootloader      central processing unit (CPU)

firmware      hardware      operating      output      system      user

..... System ..... software provides the services that the computer requires; an example is utility software.

..... Application ..... software is run on the operating system.

The ..... operating ..... system is run on the firmware, which is run on the ..... hardware .....

[4]

- 5 A farm has an automated drinking system for its animals. The drinking system has a water bowl that contains the water. When the water bowl is empty, it is automatically refilled.

The system uses a sensor and a microprocessor.

- (a) Identify the most appropriate sensor for this system.

..... Level/Pressure/Moisture [1]

- (b) Describe how the sensor and the microprocessor are used to automatically refill the water bowl.

You can write any 6 of these

- Sensor continually sends digitalized data to microprocessor
- Microprocessor compares data with database
- If value is outside range, microprocessor sends signals to release water and refill water bowl
- ... the bowl is filled with set amount of water / bowl is filled for a set amount of time
- An actuator is used to release water
- The whole process if repeated until it turns off/stoppe

- 6 A user wants to connect their computer to a network.

- (a) (i) Identify the component in the computer that is needed to access a network.

..... Network interface card [1]

- (ii) Identify the type of address that is allocated to the component by the manufacturer, which is used to uniquely identify the device.

..... MAC address [1]

- (b) A dynamic internet protocol (IP) address is allocated to the computer when it is connected to the network.

- (i) Identify the device on the network that can connect multiple devices and automatically assign them an IP address.

..... Router [1]

- (ii) Describe what is meant by a dynamic IP address.

It can be used to uniquely identify a device on a network and it can change each time the device connects to the network.

7 A programmer uses a low-level language to write a computer program for a vending machine.

(a) Describe what is meant by a low-level language.

It is similar to the language used by computers and it may use mnemonics.  
Some examples would be assembly language and machine code.

(b) Give **two** reasons why the programmer would choose to write the computer program in a low-level language instead of a high-level language.

Any 2 from

- Possible to directly manipulate the hardware
- No requirement for the program to be portable
- Program will be more memory efficient
- No need for a compiler/interpreter
- Quicker to execute
- Can use specialized hardware

8 A manager at a company is concerned about a brute-force attack on its employee user accounts.

(a) Describe how a brute-force attack can be used to gain access to the employee user accounts.

Any 3 from

- Trial and error to guess a password
- Combinations are repeatedly entered
- .... until the correct password is found
- Can be carried out manually or automatically with a software

(b) One possible aim for carrying out a brute-force attack is to install malware onto the company network.

(i) State **two** other aims for carrying out a brute-force attack to gain access to the employee user accounts.

Any 2 from

- To steal/view/access data
- To delete data
- To change data

- To lock account/encrypt data
- To damage the reputation of the business

(ii) Identify **three** types of malware that could be installed.

Any 3 from

- Virus
- Worm
- Trojan horse
- Spyware
- Adware
- Ransomware

(c) Give **two** security solutions that could be used to help prevent a brute-force attack being successful.

Any 2 from

- 2 step verification/2 factor authentication
- Biometrics
- Firewall/proxy server
- Strong complex password (with example), e.g, h9)i3IPLd#
- Setting a limit for login attempts
- Drop-down boxes
- Request for partial entry of passwords

9 A company uses robots in its factory to manufacture large pieces of furniture.

(a) One characteristic of a robot is that it is programmable.

State **two** other characteristics of a robot.

- It has a mechanical structure and framework.
- It has electronic components such as actuators.

(b) Give **two** advantages to company employees of using robots to manufacture large pieces of furniture.

Any 2 from

- Employees don't need to lift heavy furniture
- Employees can be protected from dangerous tasks
- Employees can utilize their skills in other tasks
- Employees don't need to perform repetitive/mundane tasks

(c) Give **one** disadvantage to the company's owners of using robots to manufacture large pieces of furniture.

Any 1 from

- Expensive to install/purchase/setup
- High ongoing costs/maintenance costs
- May deskill the workforce
- If they malfunction, production may stop

**10** A student uses the internet for their schoolwork to research what is meant by pharming.

(a) State the aim of pharming.

To obtain personal data/details



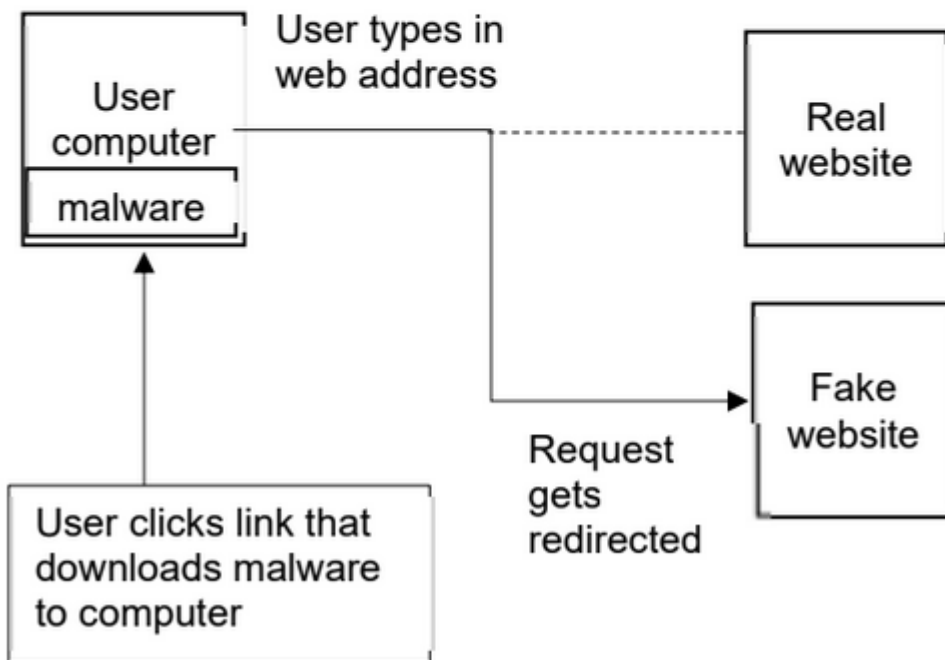
(b) Draw and annotate a diagram to represent the process of pharming.

**One mark for each correct part of the diagram.**

Diagram shows:

- User clicks/opens attachment/link that triggers download
- Malicious software downloaded onto user's computer
- User enters website address
- User is **redirected** to fake website

e.g.



(c) The student uses a web browser to access data on the internet.

Explain the purpose of the web browser.

It displays webpages by rendering HTML.

(d) Storing cookies is one function of the web browser.

Give **three** other functions of the web browser.

Any 3 from

- Storing bookmarks/favourites
- Recording user history
- Allowing use of multiple tabs

- Providing navigation tools
- Providing an address bar
- Managing protocols / checking digital certificate
- Send URL to DNS
- Sends a request to the IP address/web server (to obtain the contents of a webpage)
- Runs active script/JavaScript/client-side script
- Allows files to be downloaded from website/internet

(e) A student visits a website that uses session cookies, instead of persistent cookies.

Explain the difference between session cookies and persistent cookies.

Any 4 from

- Session cookies are stored in memory/RAM
- ... whereas persistent cookies are stored on the hard drive/secondary storage
- When the browser is closed a session cookie is lost
- ... whereas a persistent cookie is not lost
- ... until deleted by the user/they expire (for persistent cookie)

# Additional notes

If you find any errors or mistakes within this paper, please contact us and we will fix them as soon as possible.